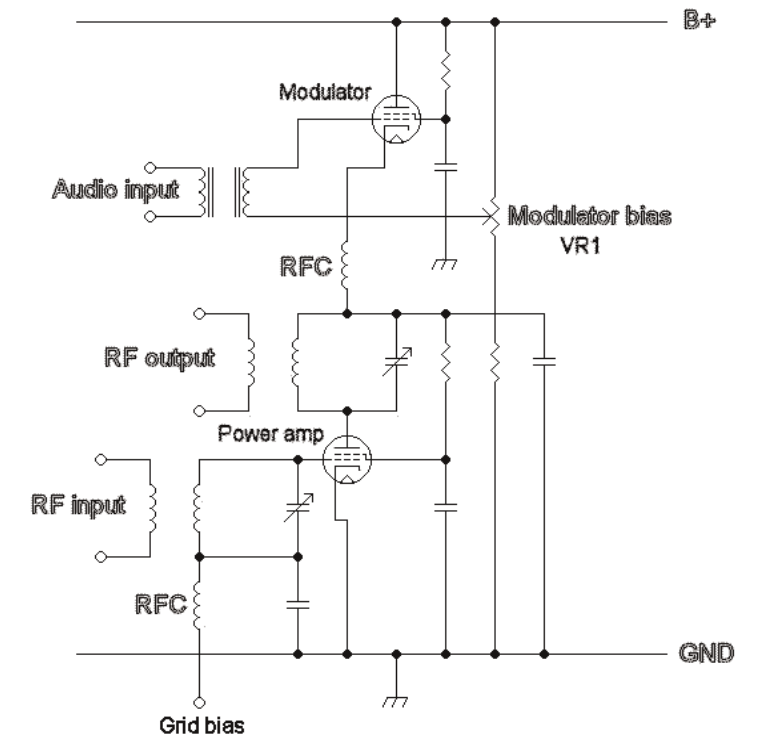


SHOUTcast Audio And Video Streaming Guide



Written By
David Childers

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Relaxing Entertainment for the World



www.BroadcastingWorld.Com

Global Broadcast Information Portal

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Front cover picture:

Series modulator using two tetrodes.

This image has been (or is hereby) released into the public domain by its author, Cadmium at the wikipedia project. This applies worldwide.

<http://en.wikipedia.org/wiki/File:Seriesmod.png>

About The Author

David Childers is the Content Manager for the Global Broadcasting portal www.BroadcastingWorld.com. He is very active in the Internet broadcast industry and has written numerous guides and a book about this growing technological field. He is also the webmaster of www.ScenicRadio.com, the global destination for relaxing entertainment.

Mr. Childers' work has been cited in several national and International publications, including these:

Five Essays on Copyright In the Digital Era
Turrer Publishing

Research On High-Profile Digital Video Production
Digital Content Association of Japan

Video Podcasting in Perspective: The History, Technology, Aesthetics and Instructional Uses of a New Medium
Journal of Educational Technology Systems

Video Podcasting: When, Where and How it's Currently used for Instruction
The National Convention of the Association for Educational Communications and Technology

IP Packet Charging Model For Multimedia Services
National University of Rwanda

Preservation of audiovisual mediums : Problems and challenges.
Platform for Archiving and Preservation of Art on Electronic and Digital Media.

P2P Technology Trend and Application to Home Network
Electronics and Telecommunications Research Institute Journal

Peer To Peer Computing - The Evolution of a Disruptive Technology
Idea Group Publishing

Peer-to-Peer Systems and Applications
Lecture Notes In Computer Science
Springer Berlin / Heidelberg

Feedback

Please feel free to contact the author if you have any questions or comments. Your feedback is greatly appreciated.

You can contact the author here: www.KL7AF.com

Foreword

Justin Frankel, Tom Pepper and Tag Loomis revolutionized audio and video broadcasting on the Internet. They created the tools that have allowed many individuals and groups to make their voices heard and be seen on a global basis.

I would like to thank Scarlet Coker for providing assistance with the editing of the manuscript and to James Davey at BroadcastingWorld for allowing me the opportunity to create this handbook.

It is my sincere hope that the reader finds this guide a valuable resource.

David Childers

August 2009

Sustaining Member



Society Motion Picture
and Television Engineers

The Internet is so big, so powerful and pointless that for some people it is a complete substitute for life.

Andrew Brown

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- Nullsoft Video (NSV) Command Line Video File Streaming
- SHOUTcast Radio And Nullsoft Video (NSV) Peer To Peer Streaming

What is SHOUTcast

SHOUTcast is a specialized software application that was created for streaming audio and video, which was developed by Nullsoft. The software has enabled hobbyists and professionals to easily create Internet radio and television stations.

SHOUTcast consists of a client-server model, with each component communicating via a network protocol. This method is able to combine multimedia content with metadata that is used to display media file titles and the station name. It uses a derivate of the Hyper Text Transfer Protocol (HTTP) for content distribution.

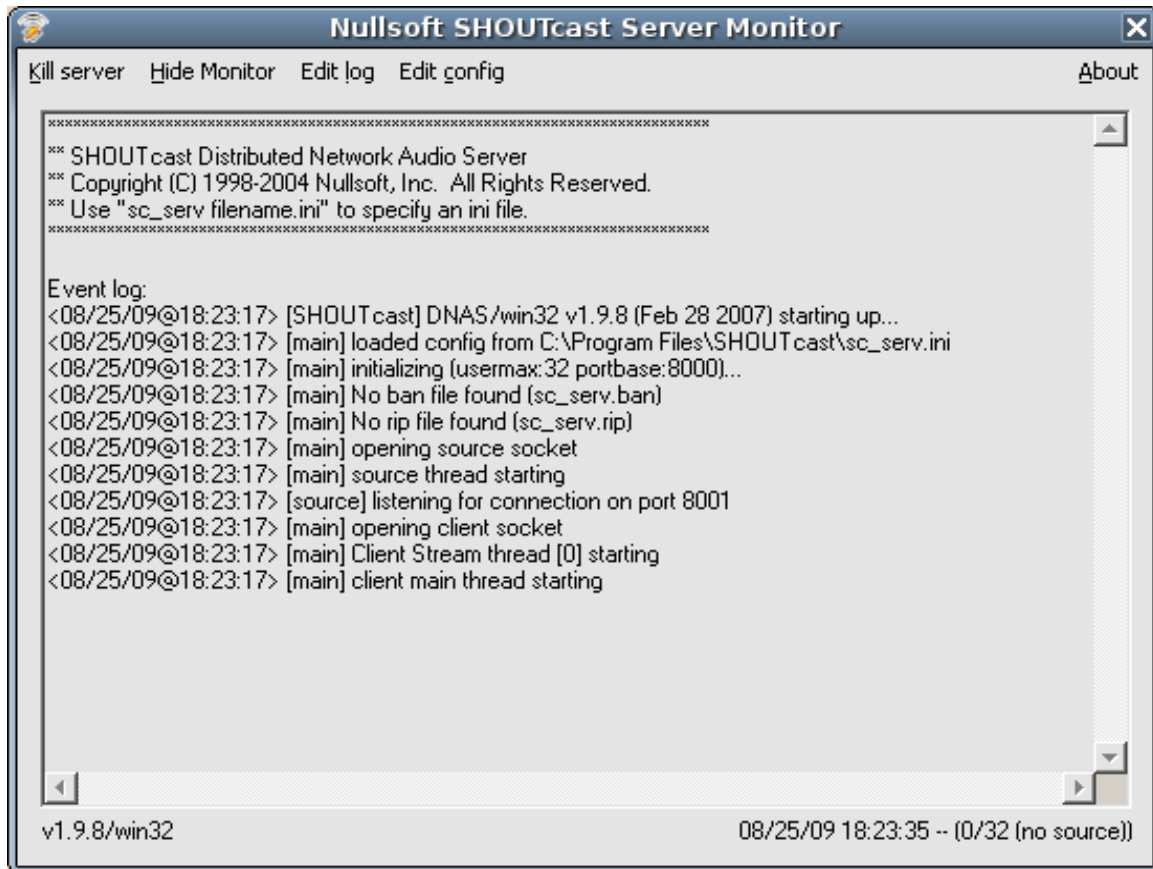
SHOUTcast Server Configuration

Download the SHOUTcast server software from here : <http://www.shoutcast.com/download>

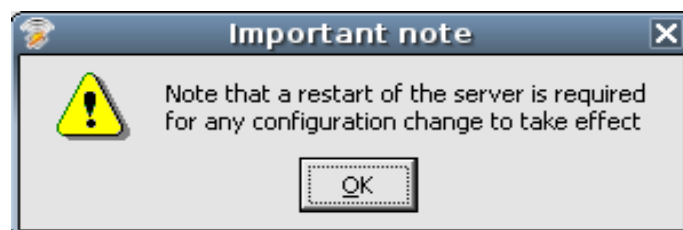
Install the SHOUTcast server software.

Start the SHOUTcast server.

Click the "Edit config" tab.

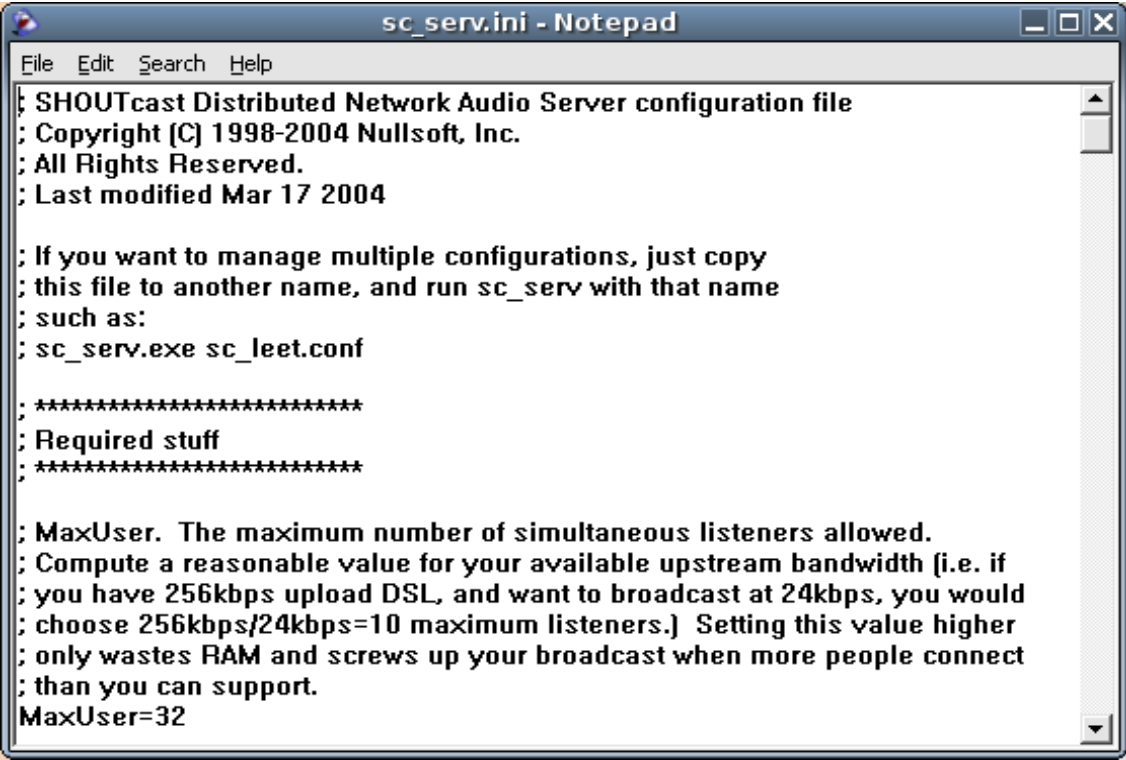


You must restart the SHOUTcast server for any configuration changes to take place.



Notepad will open up and display a document labeled sc_serv.ini.

You can make configuration changes in the SHOUTcast server operation with this file.



```
sc_serv.ini - Notepad
File Edit Search Help
; SHOUTcast Distributed Network Audio Server configuration file
; Copyright (C) 1998-2004 Nullsoft, Inc.
; All Rights Reserved.
; Last modified Mar 17 2004

; If you want to manage multiple configurations, just copy
; this file to another name, and run sc_serv with that name
; such as:
; sc_serv.exe sc_leet.conf

; *****
; Required stuff
; *****

; MaxUser. The maximum number of simultaneous listeners allowed.
; Compute a reasonable value for your available upstream bandwidth (i.e. if
; you have 256kbps upload DSL, and want to broadcast at 24kbps, you would
; choose 256kbps/24kbps=10 maximum listeners.) Setting this value higher
; only wastes RAM and screws up your broadcast when more people connect
; than you can support.
MaxUser=32
```

The first step is to change the SHOUTcast password. It is recommended that you write this password down for future reference.

The second step is to change the MaxUser count.

* Important - Your SHOUTcast server cannot exceed the bandwidth capacity of the Internet connection it is using, to support a quality multimedia stream.

This online bandwidth calculator http://www.radiotoolbox.com/online_tools/bandwidth.php can be used to determine the number of streams that the SHOUTcast server can support using its available bandwidth.

The third step is to designate the PortBase. (port base). This is the network port used for streaming.

Click on the notepad "File" tab.

Then click on the "Save" tab.

Then close the notepad.

These are the basic configurations for the SHOUTcast server.

Special Note:

If the computer that is hosting the SHOUTcast server has an active firewall or is behind a router, there are two specific network ports that must be open for data communication:

The first network port is the PortBase number selected in the configuration.

The second network port is the PortBase + 1, i.e. in the default configuration it is 8001. The 8001 port is used to receive data from Winamp or other media streaming feeders and the 8000 port is used to send streaming media to multimedia player clients.

All lines in the sc_serv.ini configuration file that are prefixed with a ";" are not read. Individual settings can be disabled by adding ";" to the start of the specific line you want to disable.

There are additional SHOUTcast server configurations that can be used for more advanced settings. These

are discussed below:

PortBase - Required Setting

This setting designates which communications port number is used to stream / send the SHOUTcast multimedia. The default port number is 8000.

MaxUser - Required Setting

This setting designates the maximum number of clients that can simultaneously connect to the SHOUTcast server at any specific time. It is important to ensure that there is an adequate bandwidth to accommodate the desired number of clients.

Password - Required Setting

This designates the password used to administer the SHOUTcast server. It is very important that the SHOUTcast server password is identical to the server password used in the SHOUTcast DSP plug-in or NSV source software.

Logfile - Required Setting

This setting designates the file that is used to log the console data. The default setting is left empty, which disables data logging. Use /dev/null/ to enable file data logging.

SrcIP - Required Setting

This setting designates which IP interface is used to receive data from the source. This setting is primarily used on machines with multiple network IP addresses or ethernet cards. The default setting is to listen to all IP addresses, which is set by using "any".

DestIP - Required Setting

This setting designates which IP interface is used to monitor for client connection requests. This setting is primarily used on machines with multiple network IP addresses or ethernet cards. The default setting is to listen to all IP addresses, which is set by using "any".

RelayServer - Optional Setting

The SHOUTcast server can be used to relay existing SHOUTcast streams. This setting instructs the SHOUTcast server not to accept any source connections, if it is being used to relay existing content. The server will attempt to connect with the SHOUTcast server designated here to relay its stream.

RelayPort - Optional Setting

This setting designates which network port number is used to stream / send the relayed SHOUTcast stream, If the SHOUTcast server is being used as a relay.

RelayPublic - Optional Setting

This setting designates if the relay is listed as public or not, if the SHOUTcast server is being used as a relay. Use "always" to make the SHOUTcast server public, or "never" to make the server non public. Using any other setting will make the server utilize the same public or private designation as the source server.

RealTime - Console systems only

This setting designates if the server will continuously display live status notifications with listener statistics.

ScreenLog - Console systems only

This setting designates if the server will continuously display all diagnostic data, in addition to logging the information to the logfile. "1" = yes, "0" = no.

HistoryLog - Optional Setting

This setting designates if the server will log information on listener count, timestamp, and metadata at set intervals. Logging will be initialized if the setting is configured to anything other than "none".

HistoryLogTime - Optional Setting

This setting designates the frequency that the server updates the HistoryLogFile, If history logging is enabled. The configuration timing is set in seconds.

Yport - Optional Setting

This setting designates the SHOUTcast server to use an alternate network port to send YP Directory data, If the SHOUTcast server is located behind a web cache. The available configuration choices are 80 and 800, with 80 being the default.

NameLookups - Optional Setting

This setting designates if the server will attempt to resolve all IP addresses to their Fully Qualified Domain Name. "1" = yes, "0" = no.

AutoDumpUsers - Optional Setting

This setting will designate if the server disconnects listeners when the source becomes inactive. If the server does not disconnect, clients remain connected and receive either dead air or the BackupFile. "1" = yes, "0" = no.

IntroFile - Optional Setting

This setting will designate if a file is streamed to the client before they are connected to the main multimedia stream. The SHOUTcast server will send this file without re-encoding it.

Caution: This file MUST be encoded using the MP3 format, and must have the exact same bitrate, samplerate, and mono/stereo setting as the stream. If the file encoding characteristics differ from the stream, the client will get severely distorted multimedia or dead air.

BackupFile - Optional Setting

This setting will designate if the SHOUTcast server will play a file to the connected clients whenever the server loses communication with the source stream or the source stream idles for more than 30 seconds.

Caution: This file MUST be encoded using the MP3 format, and must have the exact same bitrate, samplerate, and mono/stereo setting as the stream. If the file encoding characteristics differ from the stream, the client will get severely distorted multimedia or dead air.

TitleFormat - Optional Setting

This setting will designate how the stream metadata appears within the media player. If the flag %s is included within the parameter, the source title data is included at that point in the data string. Example, if the TitleFormat is configured as - 'Blue's Radio: %s', and the source media file title is 'Joe Bob Sings The Blues', then the media player title will appear as 'Blue's Radio: Joe Bob Sings The Blues'. The default is no format string.

Note: This setting works only on non-relay servers.

URLFormat - Optional Setting

This setting will designate the URL for the minibrowser. This configuration is similar to the TitleFormat setting, and is only useful if you require the use of a URL redirection in addition to tracking clients that are using the URL address.

CurrentLog

This setting provides a method for data logging to a file located on the same computer the SHOUTcast server is installed on. CurrentLog is not a defined parameter, but is a group of parameters. They are as follows:

CurrentLogIn - Optional Setting

This setting will designate the filename of an HTML template file.

CurrentLogOut - Optional Setting

This setting will designate the filename that the server outputs the file to.

CurrentLogTime - Optional Setting

This setting will designate the number of seconds that the server will wait between updating the output file.

Streaming Audio With SHOUTcast

Download the latest version of the Winamp media player software.

Download the latest version of the Winamp SHOUTcast DSP plug-in software.

<http://www.shoutcast.com/download>

Install the Winamp media player software.

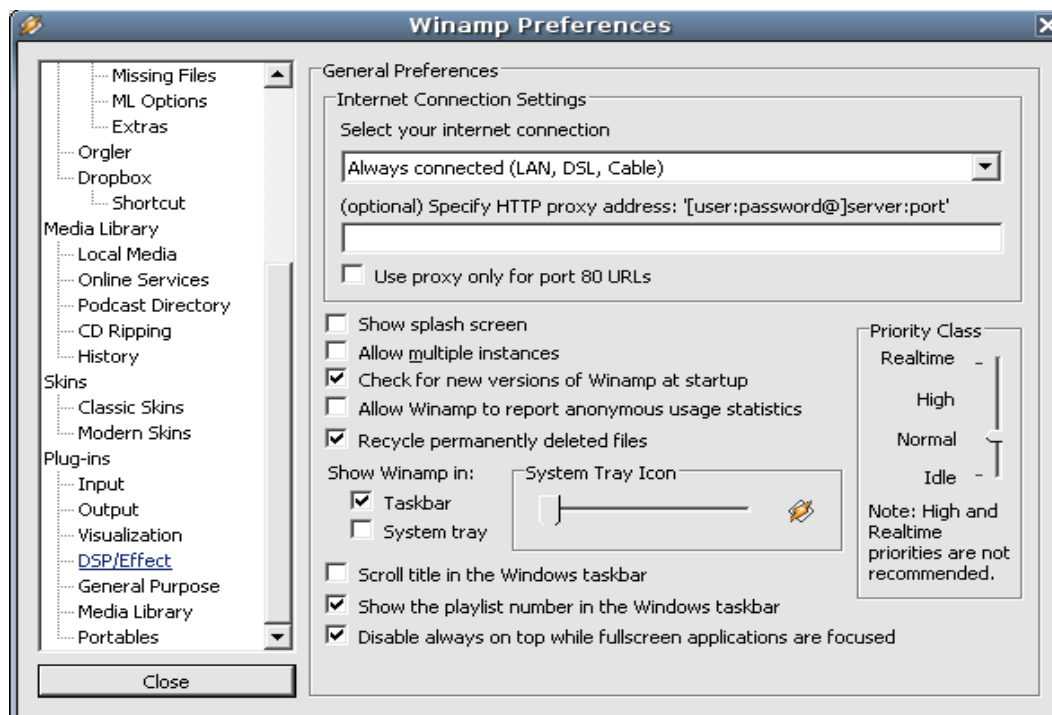
Install the Winamp SHOUTcast DSP plug-in software.

The Winamp SHOUTcast DSP plug-in digitally encodes the audio being played by Winamp. The encoded audio is then sent to the SHOUTcast server, which will distribute the encoded multimedia to the listening audience.

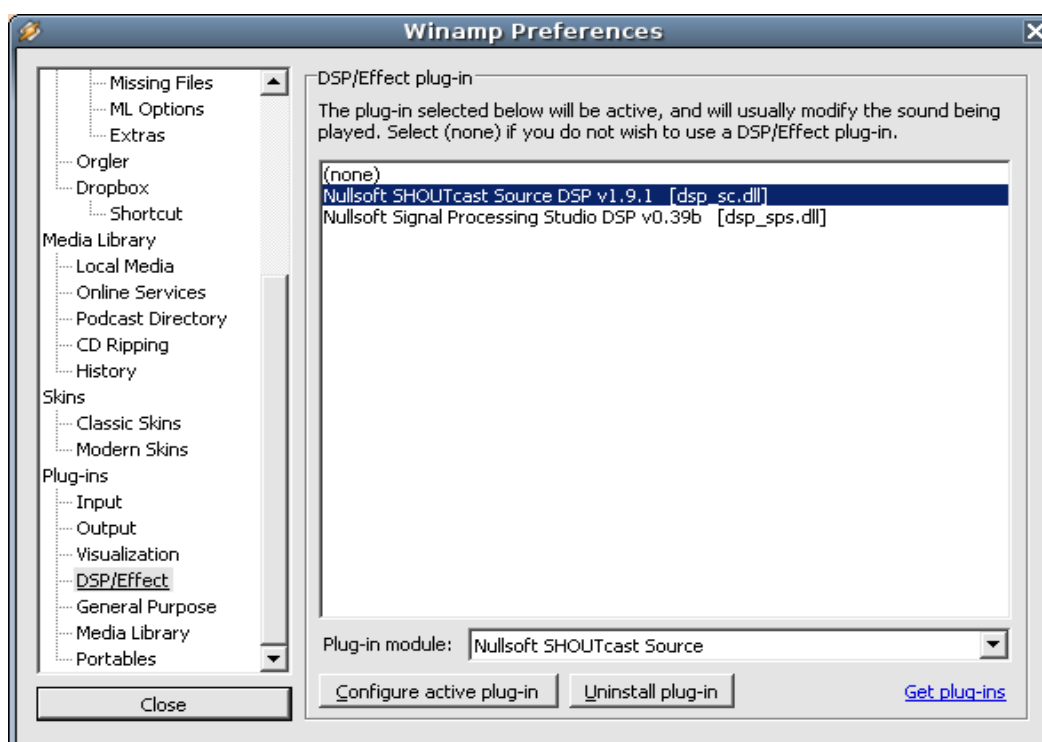
Start Winamp



Press "Control" and "P" together. This will open the Winamp Preference configuration screen.

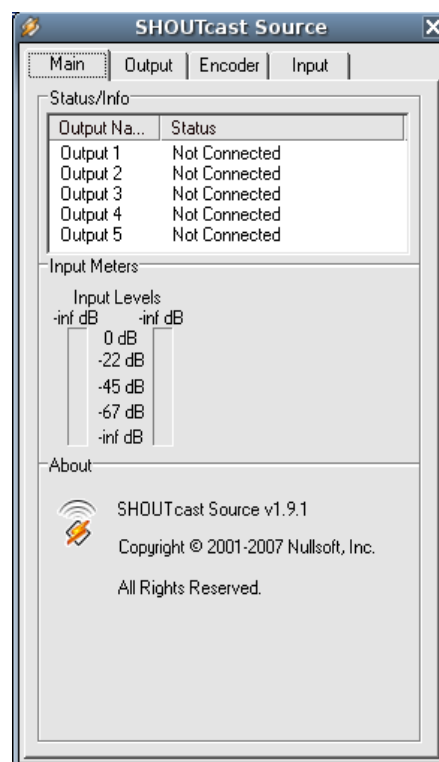


Click on “DSP/Effect” under Plug-ins. This will open the Winamp DSP/Effect plug-in window.



Click on “Nullsoft SHOUTcast Source DSP”, which is displayed on the right side of the DSP/Effect plug-in window.

The SHOUTcast Source DSP – Main configuration screen will open.



Click on the "Output" tab.

The SHOUTcast Source DSP - Output configuration screen will open.

Check "Connect at Startup".

Enter the "Address" of the computer hosting the SHOUTcast server.
(example: 189.31.115.12 for remote computer or use "localhost" if the SHOUTcast server is installed on the same computer as the SHOUTcast Source DSP plug-in)

Enter the network "Port" number that will be used for communicating with the SHOUTcast server.

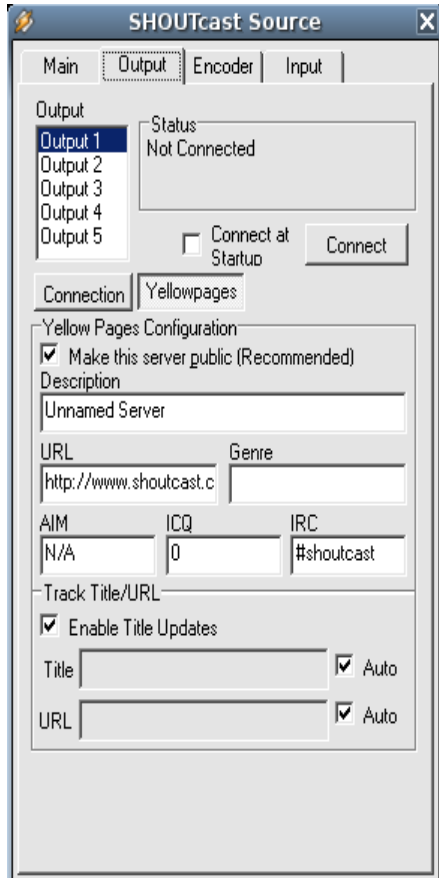
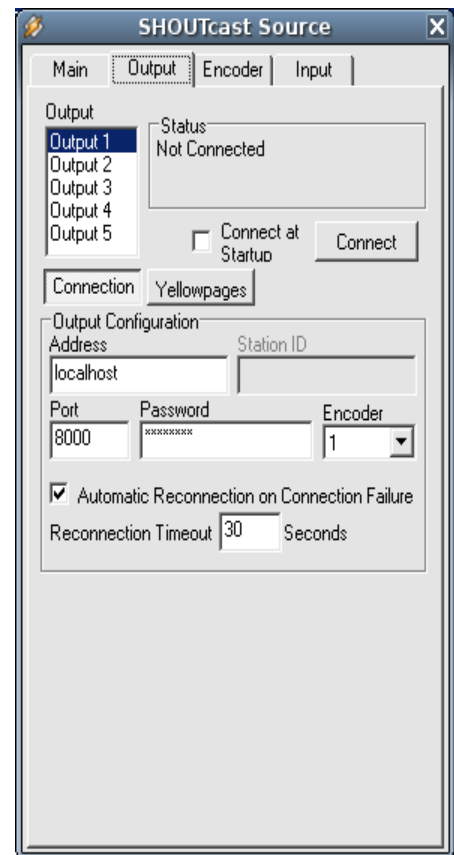
Enter the "Password" used by the SHOUTcast server.

Check "Automatic Reconnection on Connection Failure".

Enter a number for "Reconnection Timeout". This tells the SHOUTcast Source DSP plug-in to re-connect to the SHOUTcast server in a specified number of seconds if the source connection is broken.

Once this information has been entered, click on the "Yellowpages" button.

The SHOUTcast Source DSP - Yellowpages configuration screen will open.



Check the box next to "Make this server public" to have the station listed on the SHOUTcast directory.

Enter information about the station in the "Description" box.
This will inform potential audience members what your station stream is about.

If the station has a website then enter it in the "URL" box.
If you do not have a station website then leave the URL box blank.

Enter the Genre is of the type of music the station will be streaming.
This ranges from Blues, Jazz, Talk, Rap, Country or Trance etc.

There is a option of entering a AIM or ICQ screen name.
This is not mandatory information.

There is also the option of entering a #IRC channel name.
This is also not mandatory information.

Un-check "Enable Title Updates".
This configuration is used for loading title updates to web based scripts located on specific web pages.
Warning : This feature is somewhat buggy, at best.

Click on the “Encoder” tab

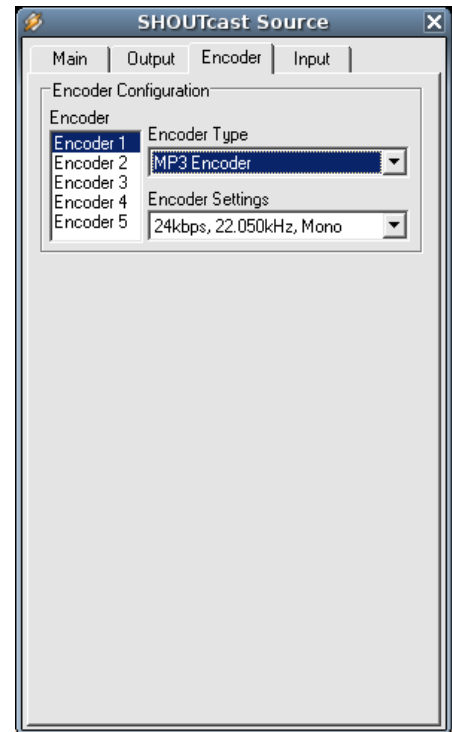
The SHOUTcast Source DSP – Encoder configuration screen will open.

Select the encoder type:

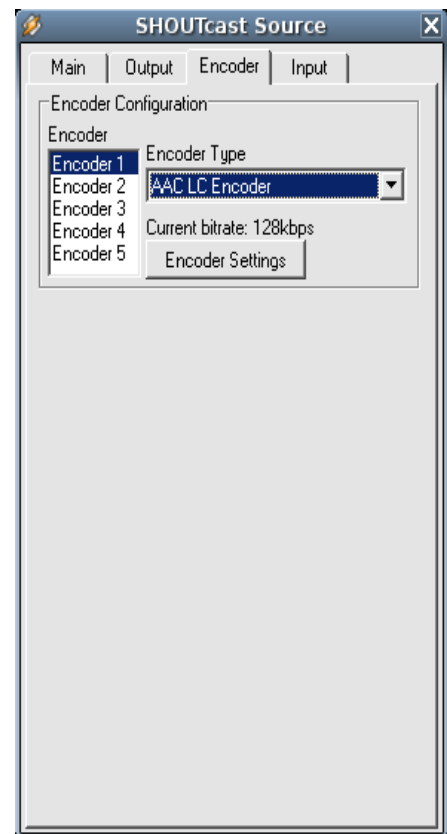
MP3
AAC
AAC+

If MP3 encoding is selected, choose the desired configurations:

Bitrate | Audio Re-sample Rate | Stereo or Mono



If AAC LC encoding was selected, Click on “Encoder Settings”.



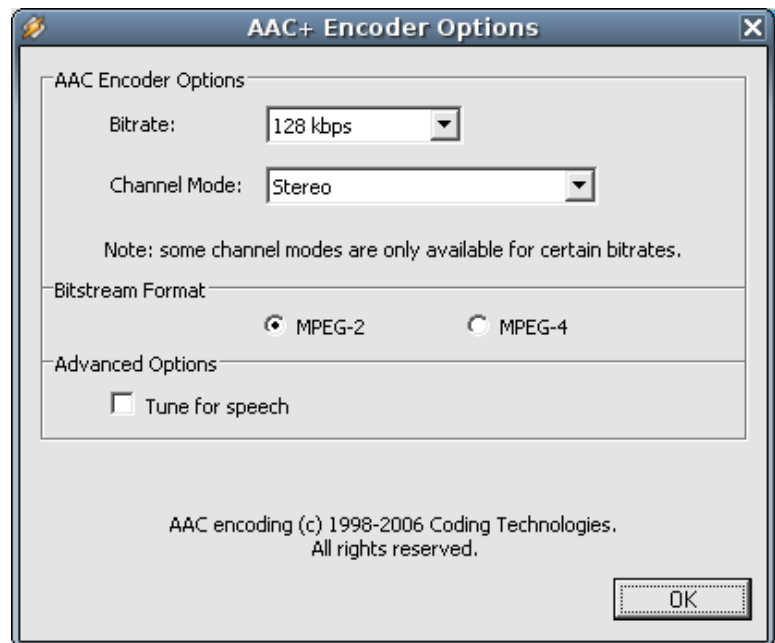
The AAC Encoder Options screen will open.

Select the desired Bitrate.

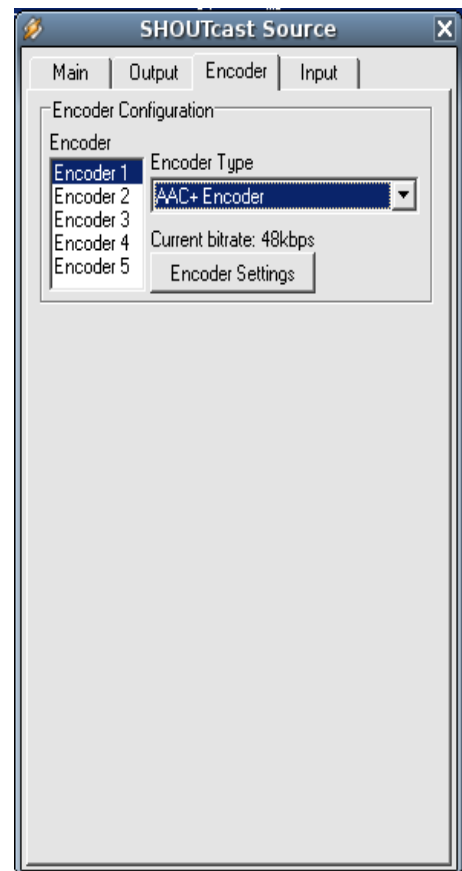
Select the desired Channel Mode.

Select the desired Bitstream Format.

Choose tune for speech under “Advanced Options” for a primarily voice broadcast.



If aac Plus encoding was selected, Click on “Encoder Settings”.



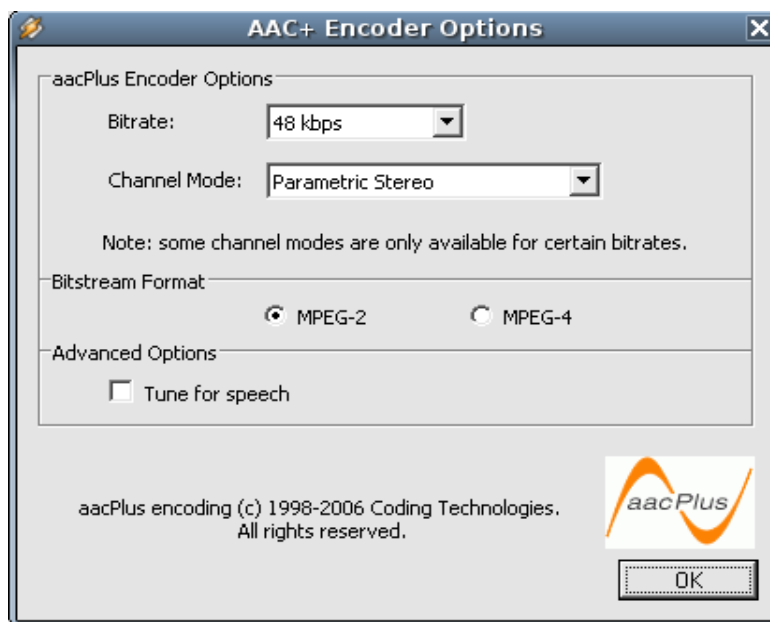
The aac Plus Encoder Options screen will open.

Select the desired Bitrate.

Select the desired Channel Mode.

Select the desired Bitstream Format.

Choose tune for speech under “Advanced Options” for a primarily voice broadcast.

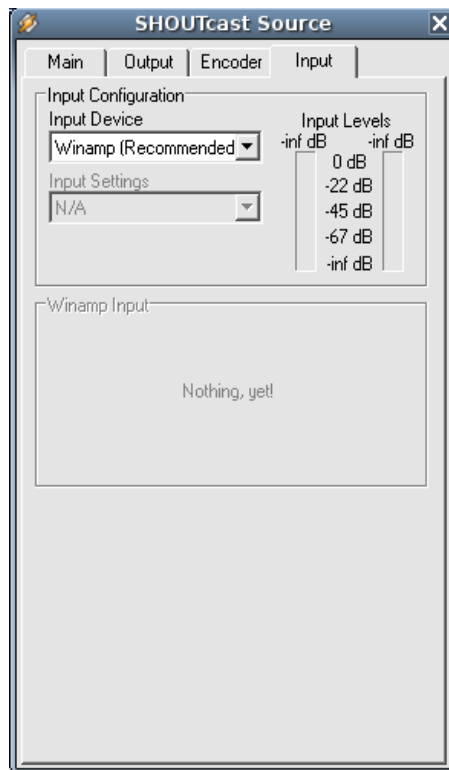


Click the “Input” tab.

The SHOUTcast Source DSP – Input configuration screen will open.

Select the input device.

- Selecting “Winamp” will input what is being played by Winamp.
- Selecting “Audio Card” will input what is being sourced into the audio card.



The necessary configurations of the SHOUTcast Source DSP plug-in have been made.

Now you can begin broadcasting from the SHOUTcast server.

- Open Winamp with the SHOUTcast Source DSP plug-in window open.
- Start the SHOUTcast server, with (GUI) option.
- The SHOUTcast server will open and display various server status messages.
- Load some MP3's on the Winamp play list and press play.
- Click the "Connect" button on the SHOUTcast Source DSP plug-in Output window.

The SHOUTcast Source DSP plug-in window will indicate a connection to your SHOUTcast Server and begin streaming the music that is currently playing in the Winamp play list.

What Is Nullsoft Video (NSV)

NullSoft Video or NSV is a multimedia container format designed for Internet video streaming. NSV was developed by the same great people that created the popular Winamp media player and SHOUTcast streaming audio software.

A package of NSV software tools was also developed to allow people to encode and stream video content. There are additional third party NSV software programs that have been developed by people within the NSV broadcast / user community.

NSV supports several video and audio codecs. Most existing video files can transcoded into the NSV format. Several multimedia players also support the playback of the NSV format. (These multimedia players are available for the Windows, Linux, *BSD and Macintosh operating systems.)

NSV has broken the restrictive Internet video streaming barrier. This software allows anyone to produce and distribute live or recorded video content throughout the Internet.

The NSV software can be downloaded here : <http://nullsoft.com/nsv/>

You must install the following software to encode or stream using the NSV format.

- nsvtools-setup.exe
- nsvscsrc_031112.zip (Update)

You can find additional information about Nullsoft Video here : <http://www.scvi.net>

Nullsoft Video (NSV) Tools software information

NSV Tools - April 19, 2003

This installer contains a bunch of tools for creating, modifying, and streaming NSV.

The state of this package is fairly bleeding-edge, a more solid version with more documentation and explanation are forthcoming.

Here is a brief description of what this package contains:

- * NSVenc - command line encoder for converting MPEG/AVI/MOV, or live capture, to NSV file or stream.
- * NSVcap - app for live capture to NSV file/stream
- * NSVate - batch encoder for converting MPEG/AVI/MOV to NSV files.
- * FlaskMPEG (see below) - encoder for converting from MPEG to NSV files.
- * NSVscSrc - program for sending a series of NSV files to a SHOUTcast server
- * NSVubMux - program that muxes .sub/.srt subtitle files into a NSV file.
- * NSVtag - standalone NSV tag editor
- * demux - NSV file analyzer/demuxer
- * On2 VP3 and LAME DLLs for encoding in VP3 and MP3 (see below)

This installer contains VP3, an open source video compression codec by On2, Inc. For more information on VP3's licensing, please visit <http://www.vp3.com>.

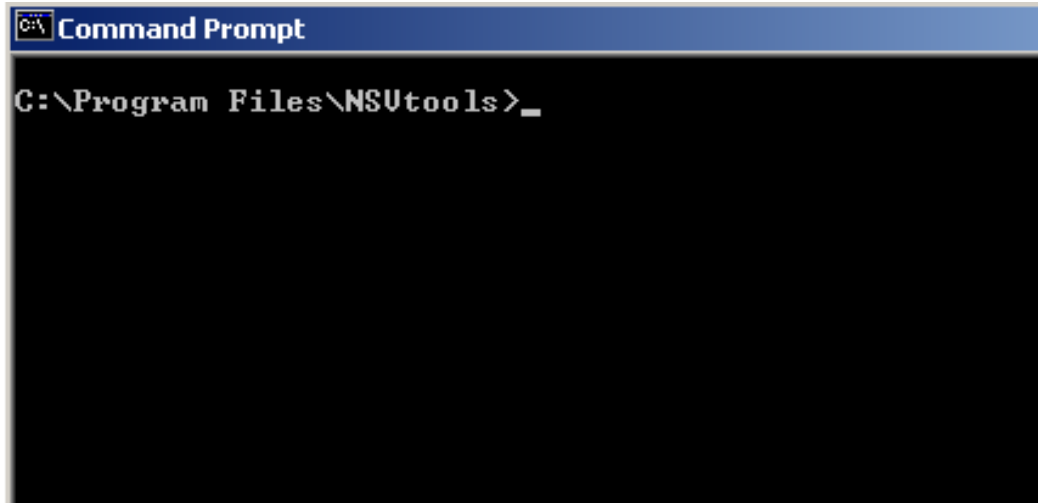
This installer contains LAME, an open source audio compressor. For more information on LAME's licensing (the LGPL), or to download the LAME source code, please visit <http://www.mp3dev.org/mp3/>

This installer contains FlaskMPEG, an open source compression tool. For more information on FlaskMPEG (the full version as well as source code), please visit <http://www.flaskmpeg.net>.

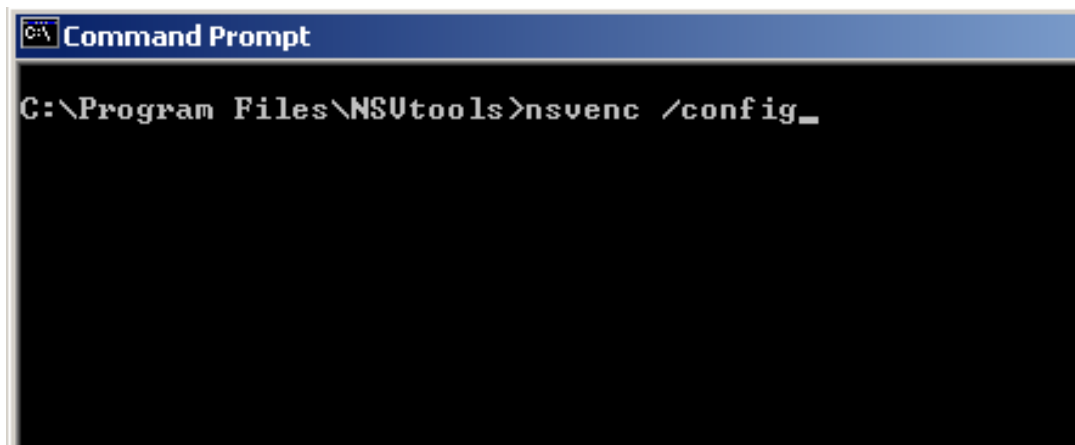
Nullsoft Video (NSV) Command Line Video File Encoding

Originally written by Andrew Barber and updated by David Childers at the Shoutcast community forums.

Open the command prompt and change to the NSVtools directory.
(Default C:\Program Files\NSVtools).

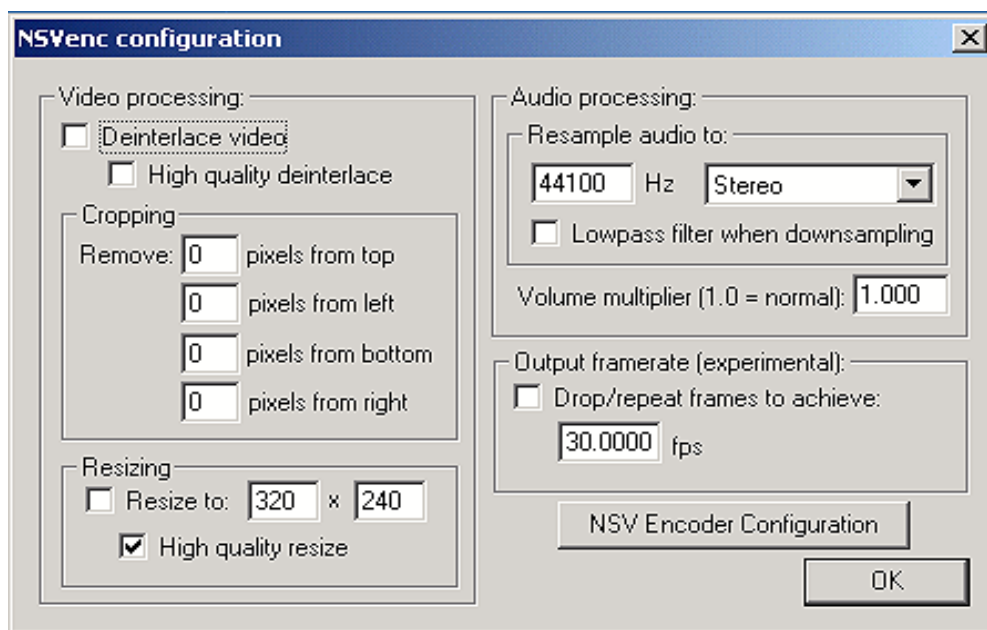


At the command prompt, type “nsvenc /config”.

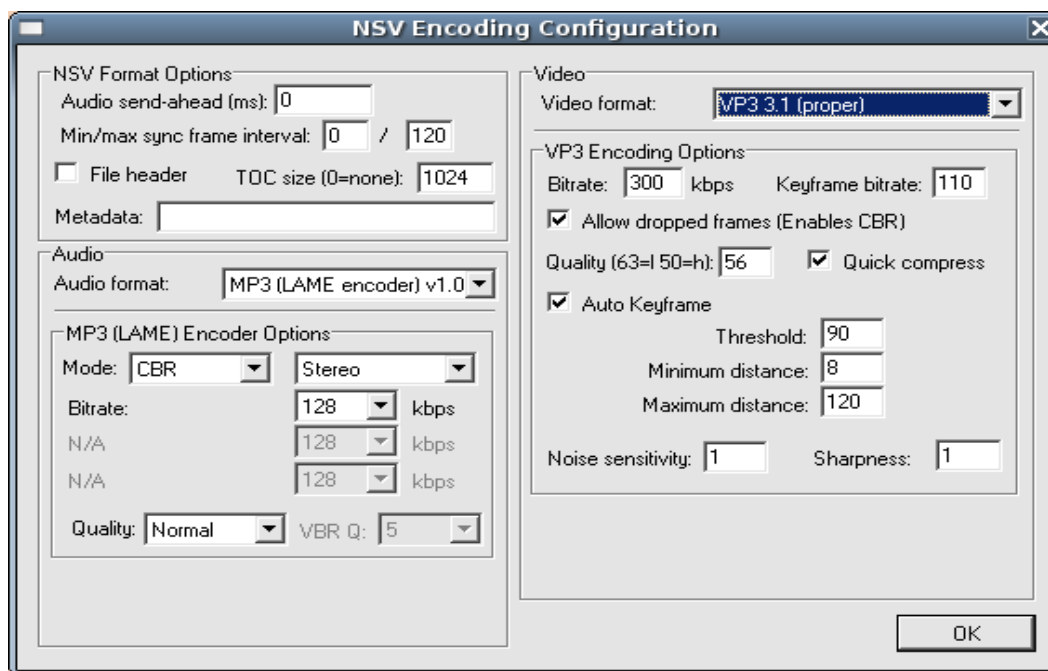


This command opens the “NSVenc configuration” window.

To select and configure the audio and video encoders, click the “NSV Encoder Configuration”.



Select the audio and video codec you want to encode with, and configure their specific encoding settings.



You can choose the MP3 (The LAME encoder installs with NSV Tools), AAC or AAC+ codec to encode the NSV audio. You must install the AAC or AAC+ encoder dll to encode content with these audio codecs.

For MP3 audio encoding you must configure the following:

- Mode : (CBR or VBR) Continuous or Variable Bit Rate encoding.
- Stereo / Mono
- Bitrate : (Encoding rate of audio.)
- Quality : (It is suggested you use "Normal".)

You can choose the VP3 (VP3 video codec installs with NSV Tools), VP6 or H.264 codec to encode the NSV video. VP3 is free for commercial or non commercial use. Both VP6 and H.264 are proprietary codecs and must be licensed for commercial use.

For VP3 video encoding you must configure the following:

- Bitrate : (Encoding rate of video.)
- Keyframe Bitrate : (Encoding rate for frames that hold a complete image.)
- Allow Dropped Frames : (This provides for Continuous Bitrate encoding.)
- Auto Keyframe : (This automatically inserts keyframe.)
- Threshold : (This determines how much contrast there is between neighboring pixels in the video, which affects the sharpness of the video.)
- Minimum Distance : (Minimum amount of video distortion allowed while encoding.)
- Maximum Distance : (Maximum amount of video distortion allowed while encoding.)
- Noise Sensitivity : (The ability to control visual noise, such as bright lights or sudden changes in lighting.)
- Sharpness : (The ability to control the sharpness or crispness of the encoded video.)

Click "OK".

Click "OK" again to exit.

Encoding is then straight forward

Syntax - nsvenc input.ext output.nsv

Example - nsvenc my_great_move.avi my_great_movie.nsv

Special Note:

The VP3, VP6 and H.264 video codecs are variable-bitrate in nature, so the bitrate won't be constant. If you need to lower the frame rate or the resolution try the option in the previous NSVenc configuration window. (These settings will increase CPU usage).

Any DirectShow decodable file (AVI, MPEG, etc.) can be transcoded into NSV, assuming the computer has the proper DirectShow filters. You can use the Gspot Codec Information Appliance to find out what video and audio codecs were used for encoding a source video file.

FFDSHOW is a DirectShow decoding filter that can be used in conjunction with NSV to transcode video that was encoded using "exotic" multimedia codecs. (Such as DivX, Xvid etc.)

If you have any encoding problems, you can force some video properties using the "source settings" and "directshow settings" switches from the command line. Just type nsvenc with no parameters for a full switch listing.

Suggested VP3 video codec encoder settings.

NSV Format options

Audio send-ahead ms : 0
Min / max sync frame interval : 19 / 19
TOC Size : 1024

VP3 Encoding Options

Bitrate : 110 kbs
Keyfram Bitrate : 110
Check : Allow dropped frames (Enable CBR)
Quality (63=|50=h) :50

Check Auto Keyframe

Threshold : 90
Minimum distance : 8
Maximum distance :120
Noise sensitivity :1
Sharpness : 1

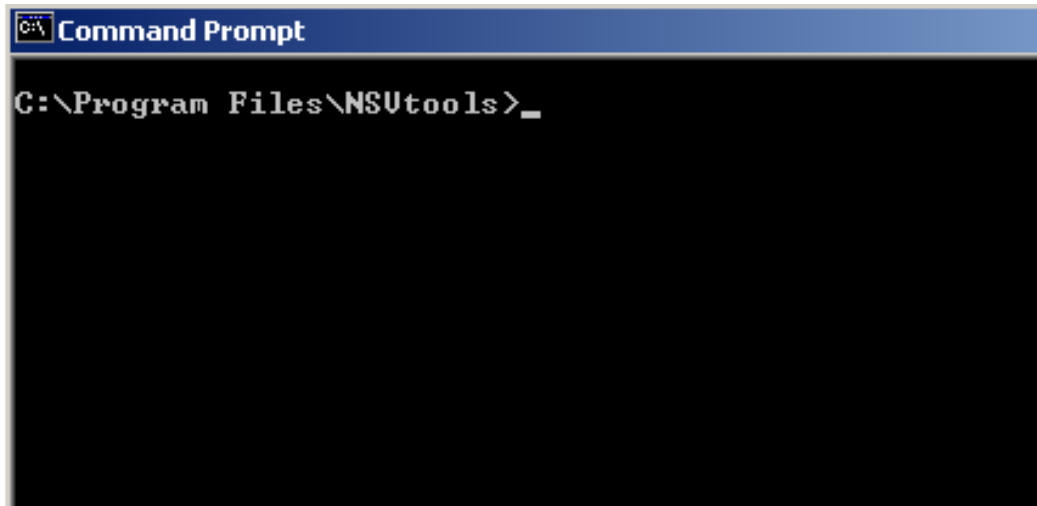
If the encoded video loses synchronization with the encoded audio, try these tips:

- Force "Framerate" to a whole number. (For example - 18 or 24)
- Check "AutoKeyFrame".
- Make "Threshold" 2X the frame rate. 40 - (2 x 20)
- Make "Minimum Distance" 2 X the frame rate. 40 - (2 x 20)
- Make "Maximum Distance" 4 X the frame rate. 80 - (4 x 20)

Nullsoft Video (NSV) Command Line Video File Streaming

Open the command prompt window.

Change to the NSVtools directory.



In the command prompt window, type the following command :

nsvscsrc [options] / SC host:port:pass:headers.txt [directory] [directory options]

[options]

/titles - informs the server of title changes using the filenames

/shuf - shuffles each directory of files

host - IP address of the SHOUTcast server

port - baseport of SHOUTcast server

pass - SHOUTcast server password

NSV Headers txt example:

```
-----
changeme <-- SHOUTcast server password
content-type:video/nsv <--DO NOT CHANGE
icy-metadata:1
icy-name:MY-TV <--Your station name
icy-genre:My-TV <--Type of genre
icy-pub:1 <--Publicly listed on Winamp TV directory 0=NO 1=YES
icy-br:128 <--ESTIMATED bitrate
icy-url:http://www.mywebpage.com <--Your website
icy-irc:#My-TV <--Your IRC channel
icy-icq:***** <--Your ICQ Number
icy-reset:1 <--DO NOT CHANGE
-----
```

[directory]

Hard Drive Letter : \Directory Name

[directory options]

You can use /nb <number> to specify how many files will play from each directory.

/nb 3 dir1 /nb 1 dir2 -> will play 3 files from directory 1 then 1 file from directory 2 then 3 more files from directory 1 and so on.

After completing the proper command syntax and initiating the command, your NSV content will start sourcing to the SHOUTcast server and display as connected on the server log.

Stream Archiving

You can archive (record) a video stream while using the NSV command "nsvenc".

- You must type in the command line syntax for "nsvenc".

- After entering the server information / headers.txt, add a "+" at the end of the command line syntax, then enter a file name followed by .nsv.

Example :

C:\Program Files\NSVtools\nsvenc NSVenc v0.80 (4/19/03) -

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usage: nsvenc [/options] [out.nsv|sc:host:port:headers.txt[+out.nsv]]

SHOUTcast Radio And Nullsoft Video (NSV) Peer To Peer Streaming

Both SHOUTcast radio and Nullsoft Video (NSV) can be streamed using Peer To Peer content distribution.

These open source projects support SHOUTcast radio and Nullsoft Video (NSV).

GoalBit :

(Active development. Based on BitTorrent)

<http://goalbit.sourceforge.net/>

GoalBit Documentation :

<http://www.scribd.com/doc/14857593/Goabit-Users-Manual>

Peercast :

(Tree - mesh distribution method. No longer being updated.)

<http://www.peercast.org>

Peercast Documentation :

<http://www.scribd.com/doc/7384918/Peercast-Users-Manual>

<http://www.scribd.com/doc/18007748/Peercast-Users-Manual-Second-Edition>